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Alsaleh et al.

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(54) **SET OF CONSTRUCTION PANELS**

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A63H 33/04 (2006.01)
A63H 33/08 (2006.01)
E04B 1/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A63H 33/08*** (2013.01)

(58) **Field of Classification Search**
CPC A63H 33/00; A63H 33/04; A63H 33/08; A63H 33/12; A63H 33/16; A63H 33/107; A63H 33/108; E04B 1/00; E04B 1/3421; E04B 1/34384; Y10T 24/53; Y10T 24/49826
USPC ..... 446/85, 108, 111, 113–116, 120, 124, 446/126; 269/289 R, 900, 302.1, 43, 47
See application file for complete search history.

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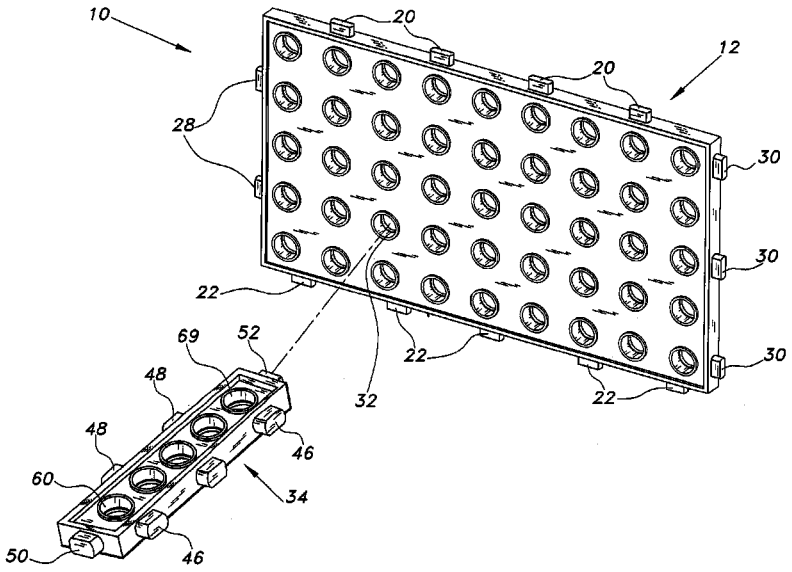
(57) **ABSTRACT**

The set of construction panels is a set of toy building panels including two basic types of construction panels. The first type of construction panel includes a first planar member having at least one side edge and at least one first engaging member protruding from the at least one side edge thereof. A plurality of first apertures are formed through the first planar member, such that the plurality of first apertures are arrayed as a regular rectangular grid. The second type of construction panel includes an elongated planar member having at least one side edge and at least one second engaging member protruding from the at least one side edge thereof. A linear row of second apertures are formed through the elongated planar member. The construction panels may be releasably connected together by releasable insertion of the engaging members of one panel into the apertures of another panel.

14 Claims, 7 Drawing Sheets



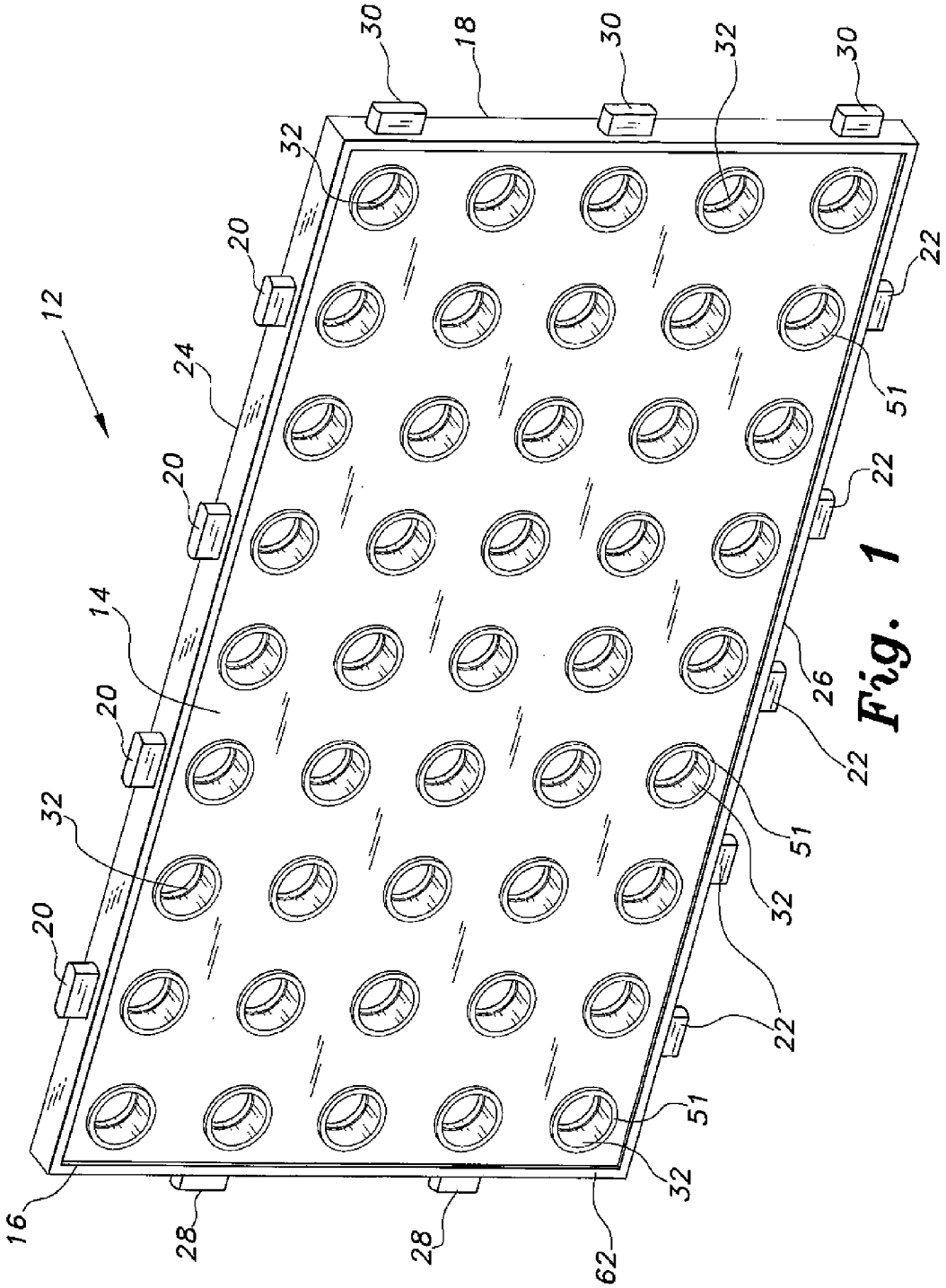


Fig. 1

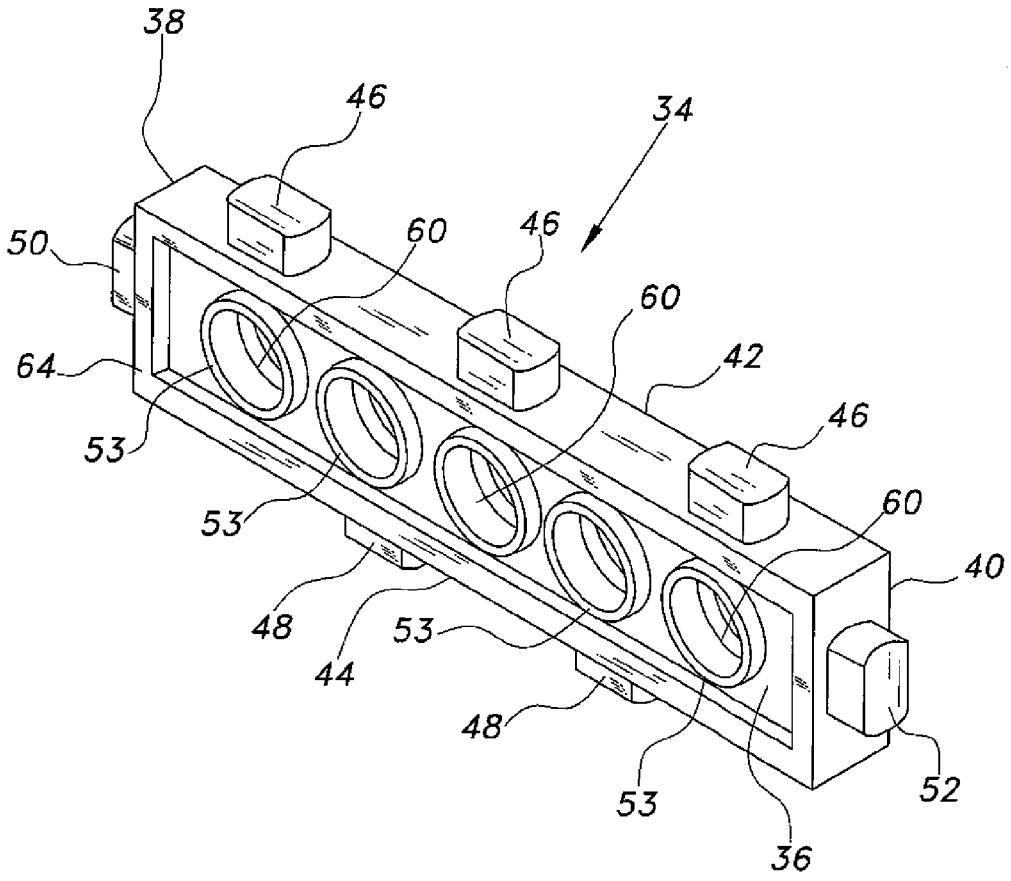


Fig. 2

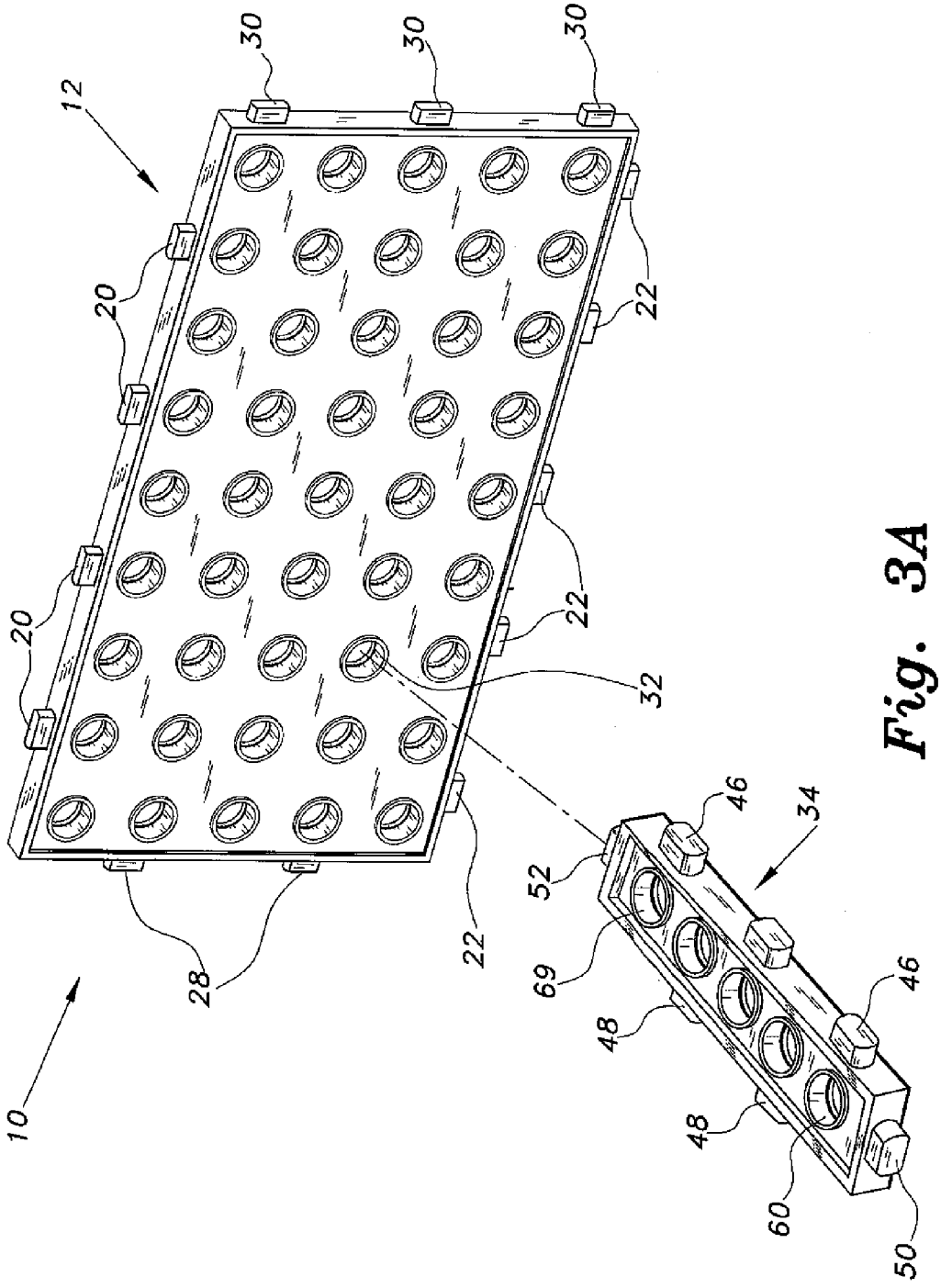


Fig. 3A

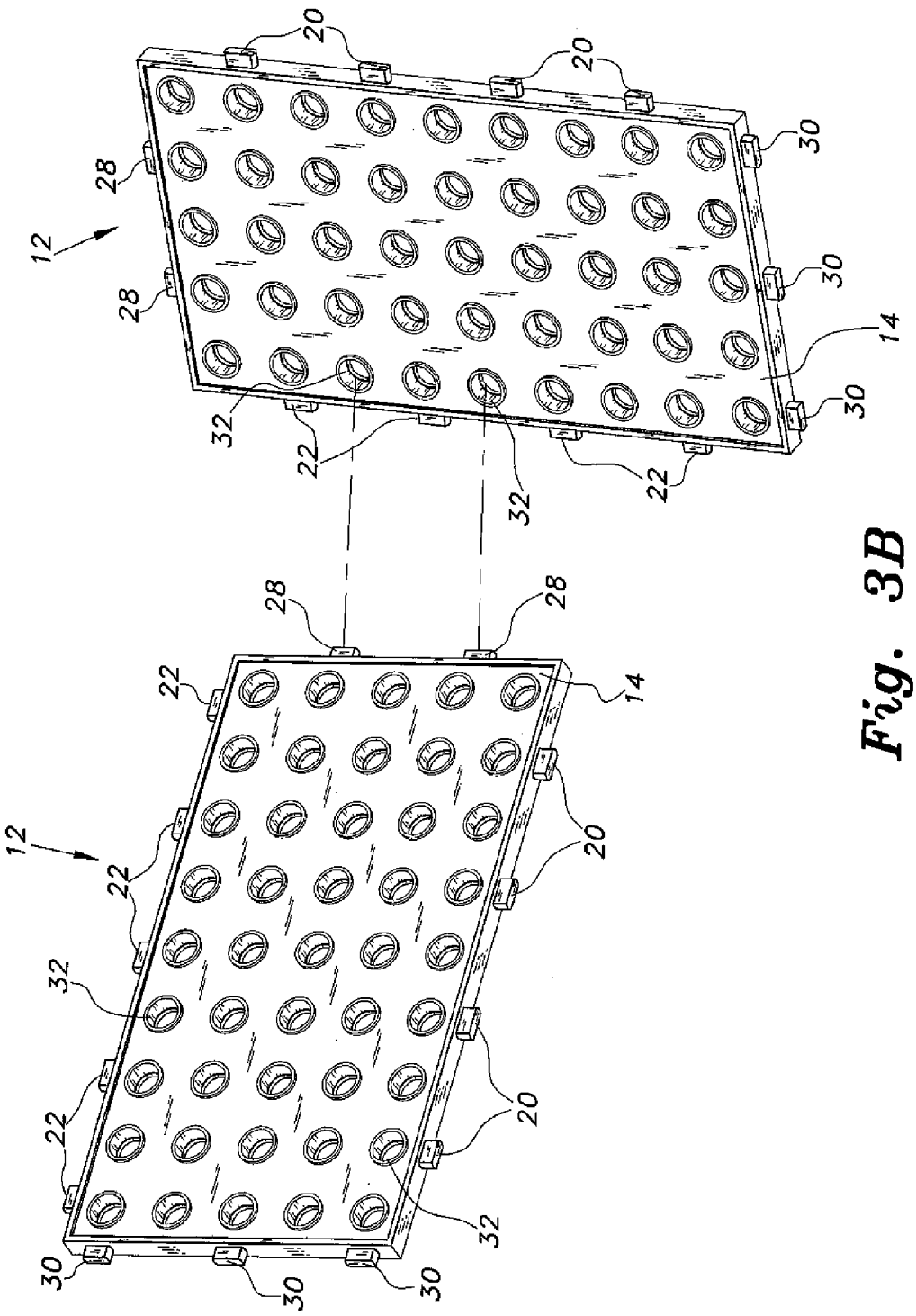

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Fig. 3B

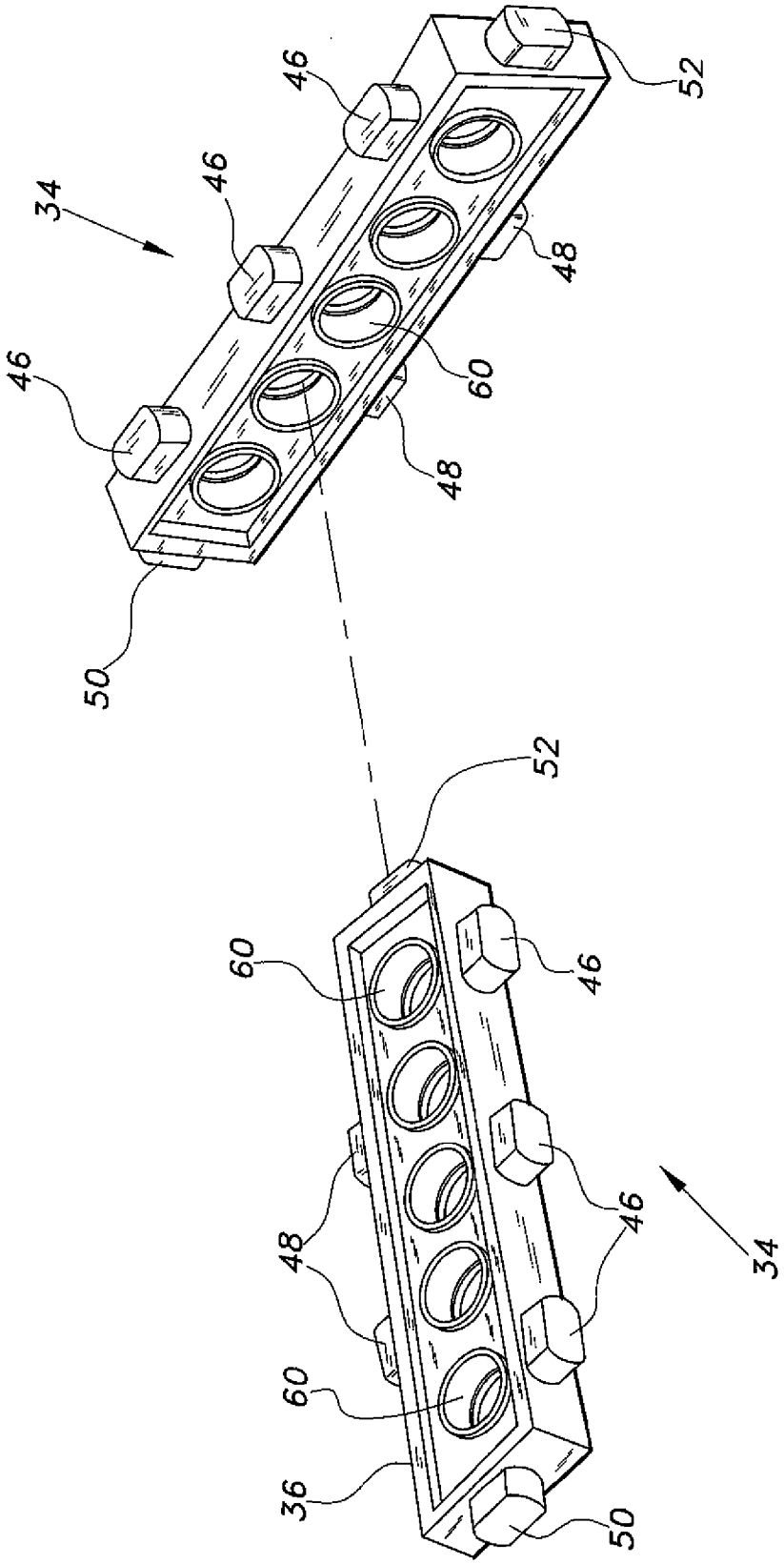

Fig. 3C

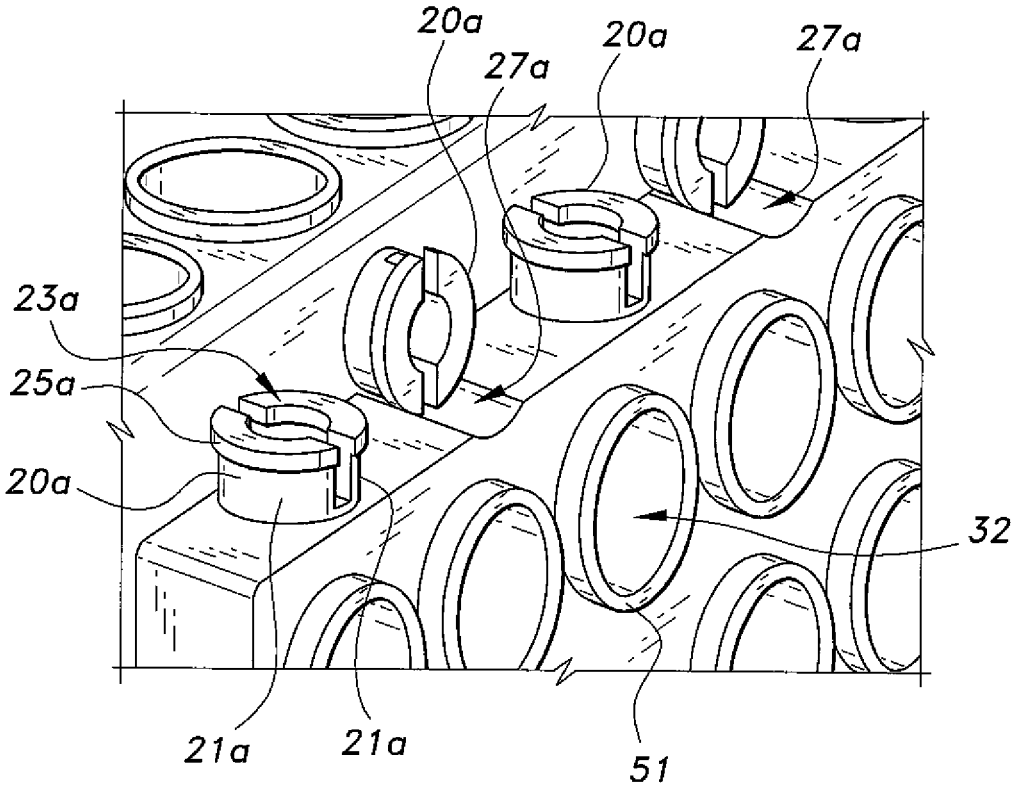

Fig. 4

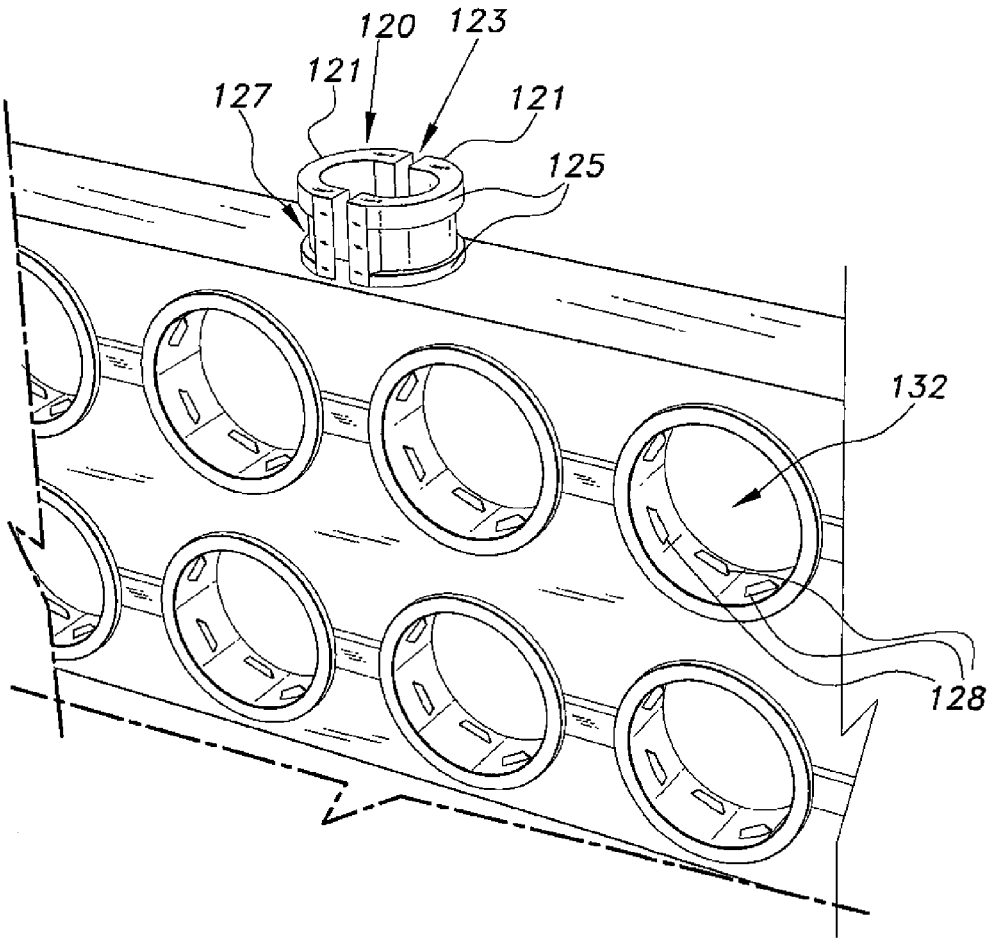

Fig. 5

SET OF CONSTRUCTION PANELS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to toys, and particularly to a set of building or construction panels where each panel includes edge-protruding engagement members for releasable engagement with corresponding apertures formed through a planar portion of each panel.

2. Description of the Related Art

Building structures for children are typically either cube-shaped blocks that simply sit next to and on top of one another, or lock together using a series of protrusions and corresponding recesses. In the latter case, the protrusions are commonly formed on the top of each panel for reception in recesses formed in the bottom of an adjacent panel. Although structures formed from such blocks provide vertical stability in a similar manner to that of a brick wall, there is no direct horizontal linkage between horizontally adjacent ones of the blocks, thus making a structure formed from such blocks fundamentally weak. Further, as the sides of the blocks are not in direct connection with one another, secure connections for structures other than planar walls, such as a perpendicular joint between two blocks, are not possible. Thus, a set of construction panels addressing the aforementioned problems is desired.

SUMMARY OF THE INVENTION

The set of construction panels is a set of toy building panels. Each panel is generally flat or planar having a flange extending from at least one edge of the panel, one or more pegs or engaging members extending from the flange, and one or more sockets or apertures defined in the panel. Accordingly, a first type of construction panel can include a first planar member having at least one side edge and at least one first engaging member protruding from the at least one side edge thereof. A plurality of first apertures are formed through the first planar member. The plurality of first apertures can for example, be arrayed as a regular rectangular grid. A second type of construction panel can include an elongated planar member, i.e., narrower than the first construction panel, having at least one side edge and at least one second engaging member protruding from the at least one side edge. A linear row of second apertures can be formed through the elongated planar member. In use, one construction panel may be releasably connected to another by releasable insertion of at least one of the engaging members of one panel into at least one of the apertures of the other panel.

These and other features of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a first type of construction panel of a set of construction panels according to the present invention.

FIG. **2** is a perspective view of a second type of construction panel of the set of construction panels according to the present invention.

FIG. **3**A is a perspective view of one of the first type of construction panels being releasably connected to one of the second types of construction panels.

FIG. **3**B is a perspective view of one of the first type of construction panels being releasably connected to another one of the first types of construction panels.

FIG. **3**C is a perspective view of one of the second type of construction panels being releasably connected to another one of the second types of construction panels.

FIG. **4** is a partial perspective view of an alternative embodiment of the set of construction panels.

FIG. **5** is a partial perspective view of another alternative embodiment of the set of construction panels.

Unless otherwise indicated, similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The set of construction panels **10** is a set of toy building panels. Each panel can have a generally flat or planar member, a flange extending from the peripheral edge of the planar member, pegs or engaging members extending from the flange, and sockets or apertures defined in the planar member. The dimensions and shapes of the planar members can vary. For example, referring to FIG. **1**, a first type of construction panel **12** can include a first planar member **14**. In FIG. **1**, the first type of construction panel **12** is shown as having a rectangular contour, although it should be understood that this rectangular contour is shown for exemplary purposes only, and that the first type of construction panel **12** may have any desired overall contouring and relative dimensions.

In the rectangular example of FIG. **1**, the first construction panel **12** has a pair of longitudinally opposed side edges **16**, **18** and a pair of laterally opposed side edges **24**, **26**. The pair of longitudinally opposed side edges **16**, **18** and the pair of laterally opposed side edges **24**, **26** can form a flange **62** extending from the periphery of the first planar member **14**.

As shown, a plurality of first apertures **32** are formed through the first planar member **14**, such that the plurality of first apertures **32** are arrayed as a regular rectangular grid; i.e., the first apertures **32** define a plurality of linear, longitudinally extending rows of first apertures (extending from side edge **16** to side edge **18**) and also a plurality of linear, laterally extending rows of first apertures (extending from side edge **24** to side edge **26**). In FIG. **1**, the first type of construction panel **12** is shown as having five linear, longitudinally extending rows of first apertures and nine linear, laterally extending rows of first apertures, however, as noted above, this configuration is shown for exemplary purposes only, and any desired number of apertures **32** may be formed through the first planar member **14** in any desired grid arrangement.

Preferably, as shown in FIG. **1**, the first engaging members include a plurality of first engaging members **28**, **30** protruding from each of the longitudinally opposed side edges **16**, **18**, respectively, and also a plurality of first engaging members **20**, **22** protruding from each of the laterally opposed side edges **24**, **26**, respectively. In the example of FIG. **1**, in which there are five linear, longitudinally extending rows of first apertures **32**, there are two engaging members **28** protruding from side edge **16** and three engaging members **30** protruding from side edge **18**. In general, the engaging members **28**, **30** protruding from each of the longitudinally opposed side edges **16**, **18**, respectively, can correspond in position to, i.e., can be aligned with, alternating ones of the plurality of linear, longitudinally extending rows of first apertures. Similarly, in the example of FIG. **1**, where there are nine linear, laterally extending rows of first apertures **32**, there are four engaging members **20** protruding from side edge **24** and five engaging

members **22** protruding from side edge **26**. In general, the engaging members **20**, **22** protruding from each of the laterally opposed side edges **24**, **26**, respectively, correspond in position to, i.e., can be aligned with, alternating ones of the plurality of linear, laterally extending rows of first apertures.

FIG. **2** shows a second type of construction panel **34**, which includes an elongated planar member **36** having at least one side edge and at least one second engaging member protruding from the at least one side edge thereof. In FIG. **2**, the second type of construction panel **34** is shown as having a rectangular contour, although it should be understood that this rectangular contour is shown for exemplary purposes only, and that the second type of construction panel **34** may have any desired overall contouring and relative dimensions. In the rectangular example of FIG. **2**, the second type of construction panel **34** has a pair of longitudinally opposed side edges **38**, **40** and a pair of laterally opposed side edges **42**, **44**. The pair of longitudinally opposed side edges **38**, **40** and the pair of laterally opposed side edges **42**, **44** can form a flange **64** extending from the periphery of the planar member **36**.

As further shown in FIG. **2**, a single linear row of second apertures **60** are formed through the elongated planar member **36**. Similar to the first type of construction panel **12**, the second type of construction panel **34**, in the rectangular example of FIG. **2**, includes a plurality of second engaging members **46**, **48** protruding from each of the laterally opposed side edges **42**, **44**, respectively, of the elongated planar member **36**. In the example of FIG. **2**, in which there are five apertures **60** formed through the elongated planar member **36** in a linear row, there are three second engaging members **46** and two second engaging members **48**, corresponding to laterally opposed side edges **42**, **44**, respectively. In general, the plurality of second engaging members **46**, **48** protruding from each of the laterally opposed side edges **42**, **44**, respectively, correspond in position to, i.e., are aligned with, alternating ones of the second apertures **60**. Additionally, as shown, a single engaging member **50**, **52** protrudes from each of the longitudinally opposed side edges **38**, **40**, respectively.

In the example of FIGS. **1** and **2**, each of the first and second apertures **32**, **60** is shown as being circular, although it should be understood that apertures **32**, **60** may have any desired contouring or size. The first engaging members **20**, **22**, **28**, **30** and the second engaging members **46**, **48**, **50**, **52** are each shown as having a substantially oval cross-sectional contour, with a major axis approximately equal to the diameter of each of first and second apertures **32**, **60**. It should be understood that the first engaging members **20**, **22**, **28**, **30** and the second engaging members **46**, **48**, **50**, **52** may have any desired contouring and relative dimensions such that each of the first engaging members **20**, **22**, **28**, **30** and the second engaging members **46**, **48**, **50**, **52** fits snugly within one of first and second apertures **32**, **60** such that individual panels of the set **10** may be releasably secured to one another through releasable frictional engagement of at least one engaging member in at least one aperture.

It should be understood that each of the panels of set **10** may be manufactured from any suitable material, such as plastic, wood, metal or the like. In FIG. **1**, each of the first apertures **32** is shown surrounded by a raised rim or lip **51**. Similarly, in FIG. **2**, each of the second apertures **60** is shown surrounded by a raised rim or lip **53**.

It should be further understood that set **10** preferably includes multiple ones of each of the first type of construction panel **12** and the second type of construction panel **34**. In FIG. **3**A, for illustrative purposes, a simple set **10** is shown composed of one of the first type of construction panels **12** and one of the second type of construction panels **34**. In the example of FIG. **3**A, a single engaging member **52** of the second type of construction panel **34** is shown being inserted into a selected one of first apertures **32** of the first type of construction panel **14** to releasably secure the second type of construction panel **34** to the first type of construction panel **14**. It should be understood that this configuration is shown for illustrative and exemplary purposes only, and that any of engaging members of one of the panels may be inserted into any of the apertures of the other one of the panels to releasably secure the two panels together in any desired configuration.

As shown in FIGS. **3**B and **3**C, panels of the same type may also be releasably secured to one another. In the example of FIG. **3**B, a pair of engaging members **28** of the first type of construction panel **12** is shown being inserted into a selected pair of first apertures **32** of another one of the first type of construction panel **14**. In FIG. **3**C, a single engaging member **52** of the second type of construction panel **34** is shown being inserted into a selected one of second apertures **60** of another one of the second type of construction panel **34**. It should be understood that the configurations of FIGS. **3**B and **3**C are also shown for illustrative and exemplary purposes only, and that any of engaging members of one of the panels may be inserted into any of the apertures of the other one of the panels to releasably secure the two panels together in any desired configuration.

In the alternative embodiment of FIG. **4**, engaging members **20***a* (which serve a similar function as engaging members **20**, **46**) are formed as substantially cylindrical shells, with an axial cut **23***a* being formed therethrough, thus dividing each engaging member **20***a* into a pair of semi-cylindrical shell members **21***a*, as shown. A raised lip **25***a* is preferably formed circumferentially about the free end of engaging member **20***a*, as shown. Each engaging member **20***a* preferably has a diameter approximately equal to the diameter of the apertures **32**, **60**, with the raised lip **25***a* having a greater diameter. Thus, in order to insert one of the engaging members **20***a* into a corresponding aperture **32**, **60**, similar to the embodiments of FIGS. **3**A, **3**B and **3**C, the pair of semi-cylindrical shell members **21***a* can be squeezed together such that the raised lip **25***a* will fit through the selected aperture **32**, **60**. Once the engaging member **20***a* has been fully inserted, the resilient material used to form the engaging member **20***a* restores it to its original configuration, thus releasably locking the engaging member **20***a* in the aperture **32**, **60**, with the raised lip **25***a* resting on the raised rim or lip **51**, **53** of the corresponding aperture **32**, **60**.

Further, semi-cylindrical grooves **27***a* may be formed between adjacent pairs of engaging members **20***a*, as further shown in FIG. **4**. As shown, this allows engaging members **20***a* from another construction panel to releasably, frictionally engage the semi-cylindrical grooves **27***a*, providing a further method of securing the construction panels to one another.

As noted above, construction panels **12** and **34** are shown for exemplary purposes only, and the basic construction panels may have any desired relative dimensions and overall contouring. It should be understood that similar panels with different contouring (such as with angles, curves and the like) are also contemplated within the scope of the present invention. Further, it should be understood that the basic construction panels **12** and **34** may be used in combination with additional structural elements, as is well known in the field of construction blocks, bricks and panels. For example, panels **12**, **34** may be provided in a kit or set which includes additional components, such as, brackets, caps, covers, shells, wheels, gears, connectors, axles, hinges, cogs, rods, bands,

shafts, motor mounts, bushes, frames, couplings, battery casings, adapters and the like, as is well known in the field of construction blocks, bricks and panels. In particular, such a kit or set can include, in addition to panels **12**, **34**, components suitable for a robot construction kit. Further, as described above, it should be understood that variations in the relative dimensions of the basic construction panels **12**, **34** is contemplated by the present invention, as well as variations in the overall contouring of the basic construction panels **12**, **34**, such as, for example, the addition of bends or angles in the construction panels.

In the alternative embodiment of FIG. **5**, engaging members **120** (which serve a similar function as engaging members **20**, **46**, **20***a*) are formed as substantially cylindrical shells, with an axial cut **123** being formed therethrough (similar to cut **23***a* of the embodiment of FIG. **4**), thus dividing each engaging member **120** into a pair of semi-cylindrical shell members **121**, similar to the previous embodiment. A pair of raised lips **125** are preferably formed circumferentially about the opposed ends of engaging member **120**, as shown, thus defining an annular recess **127** therebetween.

Each engaging member **120** preferably has a diameter approximately equal to the diameter of the apertures **132** (similar to apertures **32**, **60**), with the raised lips **125** having a greater diameter. Thus, in order to insert one of the engaging members **120** into a corresponding aperture **132**, the pair of semi-cylindrical shell members **121** can be squeezed together such that the free one of the raised lips **125** will fit through the selected aperture **132**, similar to the previous embodiment. Once the engaging member **120** has been fully inserted, the resilient material used to form the engaging member **120** restores it to its original configuration, thus releasably locking the engaging member **120** in the aperture **132**, as in the embodiment of FIG. **4**. However, as shown in FIG. **5**, teeth **128** may be formed on the inner surface of aperture **132**. These teeth **128**, which may be arrayed circumferentially, as shown in FIG. **5**, releasably engage annular recess **127** of engaging member **120**.

It is to be understood that the present invention is not limited to the embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

We claim:

1. A set of construction panels, comprising:

at least one first construction panel comprising a first planar member having at least one side edge and at least one first engaging member protruding from the at least one side edge thereof, a plurality of first apertures are formed through the first planar member, the plurality of first apertures being arrayed as a regular rectangular grid, the plurality of first apertures defines a plurality of linear, longitudinally extending rows of first apertures, wherein the at least one first engaging member comprises a plurality of first engaging members protruding from each of the longitudinally opposed side edges of the first planar member, the plurality of first engaging members protruding from each of the longitudinally opposed side edges in alignment with alternating ones of the plurality of linear, longitudinally extending rows of first apertures;

at least one second construction panel comprising a second planar member having at least one side edge and at least one second engaging member protruding from the at least one side edge thereof, a plurality of second apertures are formed through the second planar member, the plurality of second apertures being arrayed as a regular rectangular grid, the plurality of second apertures defines a plurality of linear, longitudinally extending rows of second apertures, wherein the at least one second engaging member comprising a plurality of second engaging members protruding from each of the longitudinally opposed side edges of the second planar member, the plurality of second engaging members protruding from each of the longitudinally opposed side edges in alignment with alternating ones of the plurality of linear, longitudinally extending rows of second apertures; and

at least one third construction panel comprising an elongated planar member having at least one side edge and at least one third engaging member protruding from the at least one side edge thereof, wherein a linear row of third apertures are formed through the elongated planar member,

whereby the at least one first construction panel may be releasably connected to the at least one second construction panel by releasable insertion of at least one of the at least one first engaging member or the at least one second engaging member in a corresponding at least one of the second apertures or the first apertures, respectively.

2. The set of construction panels as recited in claim **1**, wherein each of the at least one first construction panel and the at least one second construction panel has a substantially rectangular contour having a pair of longitudinally opposed side edges and a pair of laterally opposed side edges.

3. The set of construction panels as recited in claim **1**, wherein the plurality of first apertures further defines a plurality of linear, laterally extending rows of first apertures, and the plurality of second apertures further defines a plurality of linear, laterally extending rows of second apertures.

4. The set of construction panels as recited in claim **3**, wherein the at least one first engaging member further comprises a plurality of first engaging members protruding from each of the laterally opposed side edges of the first planar member, the plurality of first engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the plurality of linear, laterally extending rows of first apertures, and the at least one second engaging member comprising a plurality of second engaging members protruding from each of the laterally opposed side edges of the second planar member, the plurality of second engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the plurality of linear, laterally extending rows of second apertures.

5. The set of construction panels as recited in claim **4**, wherein the elongated planar member of the at least one third construction panel has a pair of longitudinally opposed side edges and a pair of laterally opposed side edges, the at least one third engaging member comprising a plurality of third engaging members protruding from each of the laterally opposed side edges of the elongated planar member, the plurality of third engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the third apertures.

6. The set of construction panels as recited in claim **1**, wherein each of the first and second apertures is substantially circular, and each of the at least one first engaging member and the at least one second engaging member has a substantially oval cross-sectional contour.

7. The set of construction panels as recited in claim **1**, wherein each of the first and second apertures is substantially circular, and each of the at least one first engaging member and the at least one second engaging member comprises a substantially cylindrical shell having an axial cut formed

therethrough to define a pair of semi-cylindrical shell members, a free end of each of the semi-cylindrical shell members having a raised lip formed thereon.

8. A set of construction panels, comprising:

at least one first construction panel comprising a first planar member having at least one side edge and at least one first engaging member protruding from the at least one side edge thereof, a plurality of first apertures are formed through the first planar member, the plurality of first apertures being arrayed as a regular rectangular grid, the at least one first construction panel has a substantially rectangular contour having a pair of longitudinally opposed side edges and a pair of laterally opposed side edges, the plurality of first apertures defining a plurality of linear, longitudinally extending rows of first apertures, wherein the at least one first engaging member comprises a plurality of first engaging members protruding from each of the longitudinally opposed side edges of the first planar member, the plurality of first engaging members protruding from each of the longitudinally opposed side edges in alignment with alternating ones of the plurality of linear, longitudinally extending rows of first apertures; and

at least one second construction panel comprising an elongated planar member having at least one side edge and at least one second engaging member protruding from the at least one side edge thereof, wherein a linear row of second apertures are formed through the elongated planar member,

whereby the at least one first construction panel may be releasably connected to the at least one second construction panel by releasable insertion of at least one of the at least one first engaging member or the at least one second engaging member in a corresponding at least one of the second apertures or the first apertures, respectively.

9. The set of construction panels as recited in claim **8**, wherein the plurality of first apertures further defines a plurality of linear, laterally extending rows of first apertures.

10. The set of construction panels as recited in claim **9**, wherein the at least one first engaging member further comprises a plurality of first engaging members protruding from each of the laterally opposed side edges of the first planar member, the plurality of first engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the plurality of linear, laterally extending rows of first apertures.

11. The set of construction panels as recited in claim **10**, wherein the elongated planar member of the at least one second construction panel has a pair of longitudinally opposed side edges and a pair of laterally opposed side edges, the at least one second engaging member comprising a plurality of second engaging members protruding from each of the laterally opposed side edges of the elongated planar member, the plurality of second engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the second apertures.

12. The set of construction panels as recited in claim **8**, wherein each of the first and second apertures is substantially circular, and each of the at least one first engaging member and the at least one second engaging member has a substantially oval cross-sectional contour.

13. The set of construction panels as recited in claim **8**, wherein each of the first and second apertures is substantially circular, and each of the at least one first engaging member and the at least one second engaging member comprises a substantially cylindrical shell having an axial cut formed therethrough to define a pair of semi-cylindrical shell members, a free end of each of the semi-cylindrical shell members having a raised lip formed thereon.

14. A set of construction panels, comprising:

at least one first construction panel comprising a first elongated planar member having at least one side edge and at least one first engaging member protruding from the at least one side edge thereof, wherein a linear row of first apertures are formed through the first elongated planar member, further wherein the first elongated planar member has a pair of longitudinally opposed side edges and a pair of laterally opposed side edges, the at least one first engaging member comprising a plurality of first engaging members protruding from each of the laterally opposed side edges of the first elongated planar member, the plurality of first engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the first apertures; and

at least one second construction panel comprising a second elongated planar member having at least one side edge and at least one second engaging member protruding from the at least one side edge thereof, wherein a linear row of second apertures are formed through the elongated planar member, further wherein the second elongated planar member has a pair of longitudinally opposed side edges and a pair of laterally opposed side edges, the at least one second engaging member comprising a plurality of second engaging members protruding from each of the laterally opposed side edges of the second elongated planar member, the plurality of second engaging members protruding from each of the laterally opposed side edges in alignment with alternating ones of the second apertures,

whereby the at least one first construction panel may be releasably connected to the at least one second construction panel by releasable insertion of at least one of the at least one first engaging member or the at least one second engaging member in a corresponding at least one of the second apertures or the first apertures, respectively.

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